Chapter 6

Recovery and Other Supporting Maintenance Actions

Chapter 6 discusses recovery, collection and classification, evacuation, retrograde, and battle damage assessment and repair of Army materiel. Equipment must be retrieved, sorted, repaired, and, if feasible, returned to use. When equipment cannot be repaired on site, it must be moved to the maintenance activity best suited to repair it. This is done by recovery and evacuation. It is an owning unit's responsibility to recover equipment to its supporting maintenance activity, which either repairs the item or evacuates it to another activity for repair. When transportation requirements exceed the maintenance unit's capability, the unit requests transportation support from the DISCOM MCO or corps or theater movement control team. Applicable references for recovery training, operations, and procedures are in FM 9-43-2 and TC 43-35.

SECTION I – RECOVERY

6-1. Section I discusses recovery operations. Recovery is the process of retrieving or freeing immobile, inoperative, or abandoned materiel from the point where it was disabled or abandoned. The materiel is returned to operation or to a place where it can be repaired, evacuated, or otherwise disposed of. Recovery—

- Returns immobilized equipment to operation.
- Retrieves equipment for repair and return to the user.
- Prevents enemy capture of equipment.
- Uses enemy equipment to support United States and friendly forces intelligence.

RESPONSIBILITY

6-2. Recovery is a using-unit responsibility. In units below the battalion level, where maintenance assets are authorized, the motor sergeant, motor officer, or other designated individual manages recovery operations. In units where maintenance resources are concentrated at the battalion level, the BMO manages recovery operations. Recovery operations in CS or CSS units can be either a battalion or individual company responsibility.

6-3. Maintenance units are responsible for recovering their own organic equipment and providing limited backup support with organic wreckers or tracked recovery vehicles when requirements exceed a supported unit's maintenance capability. They may also be tasked to provide recovery support on an area basis to units without a recovery capability.

MANAGEMENT

6-4. The BMO or unit motor officer (depending on type of unit) coordinates recovery operations with the overall repair effort and available resources to support the commander's priorities and the tactical situation. The goal is timely return of equipment to operation with the least expenditure of resources. The following general principles apply to management of recovery operations:

- Centralize management of recovery operations at the battalion level whenever possible. This does not preclude delegation of recovery authority for specific operations to the company maintenance team (CMT).
- Coordinate recovery operations with the maintenance effort. Maintenance personnel repair equipment as far forward as possible within the limits of the tactical situation, amount of damage, and available resources. Use maintenance time guidelines established by the commander to make repair-or-recovery decisions. The estimated repair time helps determine to which maintenance activity the item should be recovered.
- Use the right recovery equipment for the recovery mission**.** Tracked recovery vehicles normally recover tracked equipment while wheeled wreckers normally recover wheeled vehicles. When a unit has only limited assets, it is very critical to select the right recovery vehicle for the mission.
- Do not return recovery vehicles to the rear. Instead, keep them available as far forward as the tactical situation permits. This keeps them available for immediate response as needed. The BMO coordinates recovery and evacuation requirements and may request additional support from the direct support maintenance company MST or the support battalion support operations section.
- Coordinate recovery missions with the tactical commander during all combat operations.
- Establish recovery priorities when recovery assets are limited. These depend on the commander's need for an item and the tactical situation. The type of maintenance or repair required will also affect the priority when two or more like items must be recovered. As a general rule, always recover weapons systems before tactical vehicles.

INITIATION

6-5. Table 6-1 outlines procedural steps for equipment recovery.

Table 6-1. Equipment Recovery Procedures

Step	Action
1	When the equipment operator and crew detect an inoperable condition, they should— • Assess the damage and cause of the inoperable condition. • Initiate action based on their analysis and the tactical situation.

Step	Action
2	Operator/crew/organizational maintenance personnel use organic repair and recovery capability, including— • BDAR techniques. • Self-/like-vehicle recovery. • Assistance from other units on site when unit-level recovery resources are insufficient.
3	Unit requests assistance from the recovery support section located in the UMCP. Requests must provide the following information: • Unit identification. • Equipment identification. • Location (map coordinates, when possible). • Nature of disability. • Evaluation of on-site repair capability. • Repair parts required. • Organic recovery capability. • Tactical situation and security requirements. • Recommended route of approach. Until equipment is recovered, operator/crew must remain with the equipment and follow unit standing operating procedures.
4	Once operator and crew initiate SOP/corrective measures, they should— • Take cover. • Provide local security. • Wait for assistance. • Assist maintenance/recovery personnel on their arrival with the recovery action.

REPAIR AND RECOVERY PLAN

6-6. The BMO, unit motor officer, or motor sergeant (depending on the type unit), develops a plan of action for repair and recovery of the disabled equipment based on the request for assistance.

ACTION PLAN

6-7. The BMO, unit motor officer, or motor sergeant (depending on the type unit), develops an action plan that includes evaluation of—

- Extent of damage or system failure at the breakdown site.
- Established priority for support.
- Tactical situation.
- Workload.
- Availability of maintenance and recovery personnel.
- Availability and maintenance status of recovery equipment.

CHECKLIST

6-8. The BMO assigns the repair/recovery mission to the CMT. The CMT is provided a unit checklist containing the following information:

- Breakdown location and grid coordinates.
- Cause of the breakdown.

- Specific designation of required support:
  - Personnel by rank and MOS.
  - Equipment by LIN, NSN, and quantity.
- Supply requirements—required classes of supply:
  - Class I (rations and water).
  - Class III.
  - Class V (by type and quantity).
  - Class IX (by part and quantity).
- Tactical situation:
  - Road and movement restrictions.
  - Primary and alternate routes of march.
  - METT-TC and special security or NBC defense requirements.
  - Individual clothing and equipment and NBC defense items.
  - Equipment and supplies to decontaminate the disabled vehicle.
- Communications equipment availability, including applicable call signs, primary and alternate frequencies, and required reports.
- Security and safety requirements.
- Applicable special instructions regarding the disposition of contaminated equipment, contingency plans, and any special tactical or security considerations.

SPECIAL CONSIDERATIONS

6-9. Recovery of abandoned or unmanned equipment requires special training and special consideration:

- Recovery personnel must be trained to identify contamination and search for boobytraps.
- When chemical contamination is suspected, recovery personnel must wear MOPP.
- Recovery personnel will also be trained to clear or disarm the weapons systems of supported equipment to prevent accidental discharge.

ABANDONED EQUIPMENT

6-10. Once the CMT makes the equipment safe, it proceeds with the recovery operation. The equipment is inspected to assess the damage and determine repair or recovery requirements. The CMT reports findings and the situation to the BMO. The BMO may direct repair or recovery of equipment, or it may send additional parts or personnel. The CMT proceeds with repair/recovery as directed.

6-11. If the BMO cannot be contacted, the CMT proceeds with the original plan or modifies it based on judgment, commander's priorities, and the unit SOP. During defensive operations CMTs recover equipment to the first terrain feature. From there they coordinate its removal to the UMCP. However, this should be done only if the equipment cannot be repaired at the forward MCP. During offensive operations, MSTs recover to the MSR. From that point maintenance platoon personnel pick up the equipment as they move forward.

RECOVERY DESTINATION

6-12. The following items may influence the CMT's ability to recover equipment to a destination:

- Tactical situation.
- Recovery vehicle requirements.
- Workload.
- Available resources at the unit MCP and the supporting maintenance unit.
- Extent of repairs required.

Logisticians use maintenance time guidelines established by the commanders in conjunction with these factors to decide which maintenance activity can best make the repair. The bottom line is to repair the equipment as far forward as possible using the least amount of maintenance resources.

NIGHT AND LIMITED VISIBILITY

6-13. Sometimes the tactical situation prevents access to disabled equipment. When that occurs, the BMO must carefully weigh the potential benefits of recovery against the possible loss of personnel. This is particularly true during night operations when the need for noise and light discipline further complicates the recovery process.

6-14. In general, recovery operations at night or during limited visibility are the same as during daylight. Recovery elements may require night vision devices and additional personnel assistance for ground guides. In some cases, the mission may require the tactical commander to approve the compromise of light and noise discipline. When tactical elements are conducting night or limited-visibility operations, maintenance units must anticipate a potential increase in workload.

FOREIGN MATERIEL

6-15. Responsibilities for recovery and evacuation of foreign equipment and materiel at various levels are similar to those for US materiel. Capturing units report the discovery of foreign materiel through intelligence channels. Items for which there are no disposition instructions should not be evacuated until coordinated with technical intelligence elements.

6-16. The capturing unit may be directed to evacuate the item to the C&C service company or the supporting technical intelligence unit. Or the unit may be told to guard it and leave it in place for on-site preliminary examination by technical intelligence personnel. When materiel does not need to remain in place for intelligence evaluation and the discovering unit is incapable of evacuating it, the unit may request recovery and evacuation assistance directly from the support battalion responsible for DS-level maintenance.

GENERAL EQUIPMENT

6-17. Handle electronically sensitive equipment, items easily damaged by weather or handling, pilferable items, and high-cost, low-density equipment with a special degree of care and security. Using units must turn in such

items directly to the supporting maintenance company. MSTs from the maintenance unit must transport equipment when feasible. The maintenance company repairs these items within its capability and evacuates the remainder as directed by the MMC.

EXPLOSIVE ITEMS

6-18. The presence of ammunition and explosives often complicates recovery. Personnel must remain constantly alert and should presume abandoned items are booby-trapped. Exercise caution to prevent explosion, fire, or accidental weapon discharge. When unexploded ammunition such as bombs, explosive projectiles, or boobytraps is found or suspected, request assistance from an EOD team.

6-19. If quantities of abandoned ammunition are found during recovery operations, leave the ammunition in place and notify the nearest EOD unit immediately. Do not, *under any circumstances*, attempt to touch or move abandoned ammunition.

OPERATIONS IN AN NBC ENVIRONMENT

6-20. Nuclear, biological, and chemical contamination of personnel and equipment make maintenance operations more difficult and time-intensive. Automatic chemical alarms on vehicles do not react fast enough to prevent passengers from receiving incapacitating doses of a chemical agent. Therefore, vehicle movement in a potential NBC environment normally occurs in full MOPP.

6-21. Although training extends soldiers' ability to operate effectively in MOPP, they eventually reach a physical and psychological limit. Since continuous wearing of full MOPP may hinder the recovery mission, a uniform modification may become necessary. Commanders make decisions based on the following variables:

- Chemical threat to the unit's mission.
- Unit vulnerability to future chemical attacks.
- Reaction time of unit personnel.
- Time required to don protective clothing.
- Types of potential threat agents.
- Weather conditions.
- Work rate.

6-22. Water, solvents, and petroleum products degrade the protective quality of MOPP garments. When the mission permits, individuals should replace protective clothing. Units operating in an uncontaminated area must establish NBC inspection points to monitor recovered equipment entering the area. Process contaminated vehicles through a decontamination station, or leave them downwind in a holding area away from the unit for weathering and decontamination. Label all chemically contaminated equipment and repair parts.

CONTAMINATED EQUIPMENT

6-23. If practical, decontaminate and recover equipment previously contaminated by NBC agents. Both using units and supporting maintenance units have chemical agent detection kits and radiometers to detect chemical and nuclear contamination. If the item cannot be decontaminated and the contamination is severe enough to prevent recovery and evacuation, then carefully note the location of the item. Coordinate through the battalion headquarters for decontamination or disposal instructions. Ensure maintenance unit SOPs include instructions on recovering and evacuating contaminated materiel.

HAZARDS

6-24. Table 6-2 lists hazards of recovery and precautions to take concerning them.

Table 6-2. Recovery Hazards

Hazard	Action
Wire rope and cables	Personnel handling wire rope and cables must exercise caution. Frayed cable can cause serious injury, whether static or moving. Wear heavy leather-palmed gloves and handle cables carefully.
Rigging	Inspect equipment before the recovery operation begins. Shut off engines and apply brakes to prevent movement. Ensure rigging lines do not cross or rub against each other. Cross cables only when towing a disabled vehicle.
Disabled vehicles	Before hooking up or unhooking a tow bar or disconnecting any drive parts, chock the disabled vehicle with blocks so that it can not move during the hooking and unhooking procedure. Failure to block disabled vehicles can result in serious damage or injuries. See FM 9-43-2 for proper procedures.
Backlash	During winching operations all personnel must stand clear of the wire rope a distance of the cable length plus two feet. Snapped wire cables can cause serious injury. Operators and other personnel assisting in the recovery effort should keep their hatches closed and use periscopes to view hand signals directed to them by ground guides. To eliminate confusion, use only one ground guide.
Gun tubes	Position the main gun tube in a manner that avoids damage to personnel and equipment. If the gun tube of a disabled tank collides with the recovery vehicle, have it examined by DS-level maintenance personnel before firing.
Armed weapon systems	Recovery crews should know how to make weapon systems safe in an emergency. Get immediate help from the supporting EOD unit.

SECTION II – COLLECTION AND CLASSIFICATION

6-25. Section II discusses collection responsibilities and UMCP setup responsibilities. The UMCP is a geographical area containing maintenance resources that allow maintenance support to adapt to the three-dimensional battlefield. Organizational and DS-level maintenance personnel perform required repairs designed to return maximum numbers of weapon systems to the battlefield. Repairs are designed to keep the force at maximum combat strength for the current battle and the next battle. The UMCP is the integration point of the *fix forward* concept. From the UMCP, logisticians coordinate and manage maintenance operations and resources to support the warfighting effort.

BATTALION MAINTENANCE OFFICER

6-26. The BMO has overall responsibility for maintenance operations. Directly responsible to the battalion executive officer, the BMO stays informed of the task force battle plan and coordinates maintenance efforts to support those operations. The BMO directs the CMT to place recovery assets forward to support warfighting units. In turn, those assets support the recovery of equipment to the UMCP for repair. The BMO further ensures—

- The DS MST coordinates requirements with the maintenance control offcier.
- The BMT understands the support priority and manages maintenance in the forward area of the battlefield.
- The BMT gives maintenance resource priority to forward fighting elements.
- Soldiers from the maintenance service section (MSS) reinforce the CMT.

SETTING UP AND POSITIONING A UMCP

6-27. The UMCP is located on the battlefield in the combat trains area. The BMO must coordinate with the S4 in site selection. Locate the UMCP in an area that facilitates effective radio communication with the CMT. Consider METT-TC in the overall determination and—

- Locate as far to the rear as communications allow during defensive operations.
- Locate as far forward as possible during offensive operations (preferably behind a terrain feature such as a hill mass out of range of enemy mortars).

DS MAINTENANCE COLLECTION

6-28. Maintenance or supply personnel inspect material, report its quantity and condition, and perform processing necessary for further repair or evacuation. There will be wide diversity in the types and condition of materiel brought into the collection points. Procedures must be established to control incoming materiel and to direct it to specific locations within the collection point area. This will aid in inspecting, classifying, and processing

items for repair or movement to the rear. DS maintenance units will inspect evacuated mechanical and electronic materiel and dispose of it as follows:

- Report equipment requiring no maintenance or no more than GS maintenance to the MMC; ship it to the supporting DS/GS maintenance facility or supply activity based on the MMC's disposition instructions.
- Report equipment requiring depot maintenance or considered a candidate for property disposal to the MMC; ship it to the supporting C&C point based on the MMC's instructions.
- Deliver US medical and cryptographic equipment to the supporting medical or signal activity.
- Do *not* send containers of chemical agents, ammunition, explosives, or aircraft to C&C service companies; instead, report them to the MMC for disposition instructions.
- Repair only those items directed by the MMC (friendly forces may not require such equipment even if it can be repaired).

MATERIEL CLASSIFICATION

6-29. United States and foreign materiel returned to a maintenance unit is of no value until it is inspected, classified, and reported. Classifying materiel through close inspection allows the condition code of an item to be established. Classification, which indicates the physical condition of the returned materiel, is necessary to determine the proper disposition of an item. It identifies the extent of repairs required (if repairs can be accomplished) and whether the item is worth repairing. The objective is the efficient, rapid return to use of the greatest amount of materiel.

6-30. At DS-level maintenance, qualified technicians inspect materiel IAW instructions and specifications in technical manuals, technical bulletins, and MMC directives. The inspection's results establish the materiel's condition code (classification). The classification complies with instructions in technical manuals, technical bulletins, and MMC directives. A complete listing of condition codes is given in AR 725-50.

SECTION III – EVACUATION

6-31. Section III discusses evacuation principles and responsibilities. The purpose of evacuation is to move damaged equipment from one maintenance unit to another (normally a maintenance unit with a higher-level capability). An important logistics function, evacuation also moves disabled materiel into the logistics support system. Evacuation—

- Reduces the maintenance backlog at a location.
- Moves damaged equipment to a maintenance activity that can repair it.
- Maximizes use of critical supplies and equipment.
- Matches the maintenance workload with maintenance resources.

PRINCIPLES

6-32. Logisticians manage evacuation to return the maximum number of serviceable items to using units or to the supply system. This requires close coordination of recovery, repair, and transportation:

- Evacuate equipment to the designated maintenance activity immediately after recovery.
- Make maximum use of road and railway networks.
- Evacuate by the fastest means available.
- Prioritize equipment for evacuation; evacuate critical warfighting items first.
- Streamline the evacuation process; ensure disposition instructions move equipment to the supporting activity best suited to repair it.
- Maximize use of available transportation; use vehicles to backhaul unserviceable assemblies and end-items on the return trip.
- Prevent further damage to equipment; protect it from damage in transit and from the elements with packaging, bracing, and preservation materials.

RESPONSIBILITY AND CONTROL

6-33. Each commander is responsible for evacuating unserviceable materiel as rapidly and efficiently as possible. Major commands publish evacuation policies through their MMC. The movement control team requests transportation to evacuate unserviceable materiel from one maintenance unit to another.

6-34. The ASCC MMC, in conjunction with subordinate MMCs, controls the flow of unserviceable materiel from the time of recovery until final disposition. ASCC logisticians establish general evacuation policies. In turn, subordinate commanders develop detailed standards and procedures based on ASCC policies. This ensures organizations processing unserviceable materiel have definitive disposition instructions.

6-35. Evacuation success depends largely on instructions supplied to maintenance companies by the MMC. These instructions must be complete,

timely, and seek to eliminate all unnecessary handling. If proper evacuation instructions have been issued by higher headquarters, the condition and classification of each item will determine destination. Automatic disposition instructions are used to the maximum extent possible to avoid undue delay.

SECTION IV –RETROGRADE AND RECLAMATION

6-36. Section IV discusses procedures for retrograde and reclamation operations. Overseas commands return (retrograde) materiel to CONUS. Retrograde cargo normally consists of unserviceable, economically reparable items and weapon systems destined for depot repair. Reclamation operations involve the removal by collection and classification units of serviceable or economically reparable components, assemblies, and repair parts from end-items or large components classified as uneconomically reparable. Reclamation operations significantly reduce demands on the supply system.

RESPONSIBILITY

6-37. The various areas of responsibility for retrograde operations are listed below:

- The ASCC materiel management center in coordination with CONUS commodity commands establishes the type, quantity, and condition of equipment for retrograde.
- The MMC develops and publishes criteria for maintenance units. Materiel managers identify retrograde items as far forward as practical to prevent unnecessary handling and shipment.
- In some cases, the DS-level maintenance unit can make the inspection and decision to retrograde. In other instances, GS-level maintenance units make this determination.
- When required, the MMC publishes updated lists of items to be retrograded with the quantity and destination of each. They also coordinate transportation requirements for retrograde cargo.
- The MMC coordinates and directs all retrograde shipments.

PROCEDURES

6-38. Customer units may requisition Class IX repair parts from their supporting collection and classification unit. Table 6-3 gives an example of how materiel (a tank, combat) is reclaimed, based on the assignment of a serviceable, reparable, or uneconomically reparable condition code by DS-level collection and classification units.

Table 6-3. Materiel Reclamation Procedures

Serviceable Item	Reparable Item	Uneconomically Reparable Item
The serviceable engine of an otherwise destroyed tank is placed back into the supply system.	The unserviceable yet reparable transmission of the destroyed tank is directed to the proper maintenance activity for repair and eventual return to the supply system.	The totally destroyed hull of the tank is directed through the property reutilization office as scrap.

SECTION V – BATTLE DAMAGE ASSESSMENT AND REPAIR

6-39. Section V discusses BDAR actions and training requirements. BDAR is rapid damage assessment and repair, bypassing or jury-rigging components, to restore minimum essential capability to support a combat mission or enable self-recovery. Such enabling repairs may be temporary or permanent, depending on the repair required. In many cases, they may not restore full mission capability. BDA determines damage and reparability, the assets needed to make the repair, and where the repair should take place. Battle damage repair (BDR) includes any expedient action that returns a damaged part or assembly to mission-capable or limited mission-capable condition. The purpose of BDAR is to return disabled combat equipment as quickly as possible to the tactical commander.

BDAR ACTIONS

6-40. BDAR actions include—

- Using shortcuts to install or remove parts.
- Modifying and installing components designed for other vehicles or equipment.
- Using parts serving a noncritical function on a like vehicle.
- Jury-rigging to bypass noncritical components.
- Cannibalizing critical repair parts.
- Fabricating critical parts.
- Using substitute fuels, fluids, or other petroleum, oils, and lubricants (POL).

All repairs are made IAW applicable BDAR technical manuals and available BDAR kits. At the completion of immediate combat operations, mechanics will make repairs that will return the equipment to fully mission-capable status IAW appropriate vehicle TM.

6-41. Anyone on the battlefield can perform some BDAR. However, crew, organizational and DS-level mechanics and technicians must be trained in assessing battle damage in addition to their specialties. The operator/crew performs initial BDA and repairs the damage if possible. The commander decides whether or not to use BDAR in lieu of normal maintenance procedures. Since it may not be possible to train BDAR techniques in peacetime using actual equipment, the best substitute is to train system-oriented crews and mechanics to understand the theories and principles associated with weapon systems.

BDAR TRAINING

6-42. All soldiers associated with a piece of equipment, from the operator through the direct-support-level maintenance mechanic, must be trained and proficient in the conduct of BDAR operations. The operator/crew must be able to perform initial BDA and repair damage if possible. CMT members must also be proficient in BDAR techniques. A good reference is FM 9-43-2,

designed for use by operators and by organizational and DS-level maintenance personnel. BDAR technical manuals—

- Provide a single document for each weapon system that contains proven, effective techniques. They are not meant to be all inclusive and are no substitute for an experienced mechanic who understands how a weapon system moves, shoots, and communicates.
- Are used by operators and by organizational and DS-level maintenance personnel. They have been developed for major weapons systems and are issued with the normal complement of technical manuals.
- Have also been developed for tactical wheeled vehicles as well as for combat weapon systems.
- Have the same first eight digits as other 9-series technical manuals followed by the letters "BD" (the BDAR manual for the M1 tank is TM 9-2350-200-BD-1).